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MEDICINE

Laboratory Heroes Find New All-American Disease

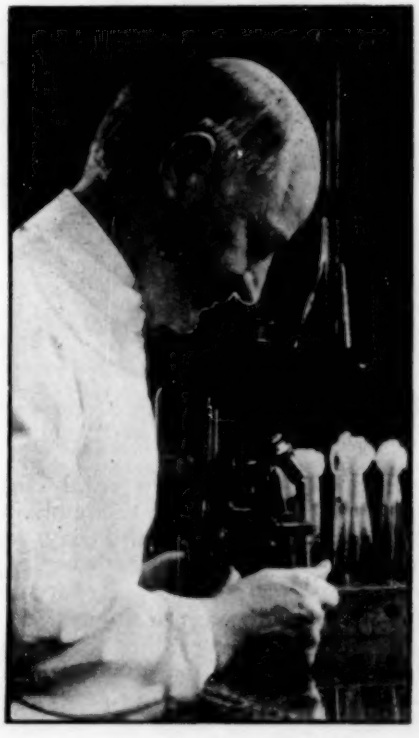
By MARJORIE MACDILL

Seven tubes of orange-reddish liquid standing in a row on the desk of Dr. Edward Francis of the U. S. Public Health Service were mute testimonials to a calamitous conclusion to several hunting parties.

"These little test tubes contain blood of people who have been taken sick with fever or swollen glands or both, after a day in the country shooting rabbits," explained Dr. Francis. "Local physicians take blood samples from suspicious looking cases and send them into us here at the Hygienic Laboratory so that we can see if they contain any traces of the little microbe known as *bacterium tularense*, one of the newest additions to the catalog of disease germs, responsible for what the local market men call 'rabbit fever'."

Dr. Francis probably knows more about this strange new disease of wild rabbits and man than any other living person. Tularemia is the name he has given it, and it is the only infection in man that has been elucidated entirely from beginning to end by American investigators alone. If it were not for the fact that some cases have recently been reported from Japan, it might with justice be called the only all-American disease.

Primarily it is an infection of rodents. In the West it has killed hordes of wild rabbits and ground squirrels. Since it was first recognized, six or seven years ago, as a distinct disease in man, it has spread steadily across the continent until only about nine states in the extreme northeast are still uninvaded. In man it is not usually fatal but manages to put its victims out of working commission for a good three months. Fever and swelling of the lymph nodes are outstanding characteristics and convalescence is long and slow. It is not communicable from person to person but is spread by contact with a diseased animal or by insect bites. These limitations, nevertheless, do not prevent it from being dynamite in the laboratory, for practically every investigator who has worked with it has become infected in spite of the most elaborate precautions.



DR. EDWARD FRANCIS

To begin at the beginning of a long story, that was pieced together bit by bit from happenings and research carried on in widely separated parts of the country over varying intervals of time, first knowledge about the disease came from an epidemic among the ground squirrels of California in 1910. Dr. G. W. McCoy, now director of the U. S. Hygienic Laboratory, was on the ground and managed to isolate from one of the squirrels, the causative organism of what is called a "plague-like disease of rodents" in 1911. This he called *Bacterium tularense*, from Tulare County, California, in which he found it. While working on it, one of his fellow investigators fell ill with a rather obscure and unexplained (at the time) attack of fever which kept him off the job for a month.

Within the next few years many complaints were heard from the farmers of Utah of what they called "deer fly fever." The flies came out during the summer months and a definite infection seemed to follow the bites so that farmers were laid up all through the alfalfa mowing season and the time for plowing sugar beets. Finally in 1919 the authorities of the U. S. Public Health Service decided to send some one out to investigate the disease. The man they picked was Edward Francis.

His subsequent investigations showed two things: one, that the blood sucking fly really did transmit the disease, and second, that the germ that caused it was the same as the one that Dr. McCoy had found in the ground squirrels of California ten years before. Five more men were assigned to the work, some in Utah and some in Washington. Before they finished every single one of them, including Dr. Francis himself, had been infected with the disease. Such a record of illness among investigators who have been assigned to work on an infectious disease has probably never been duplicated in the history of experimental medicine.

The next phase of the problem that came to Dr. Francis' attention was the "rabbit fever" among the men handling rabbits at Center Market in Washington, D. C. This disease was apparently well known to the market men long before it came to the attention of the medical profession. Investigation showed that "rabbit fever" and tularemia were one and the same thing and that many of the wild rabbits shipped into the market

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New All-American Disease

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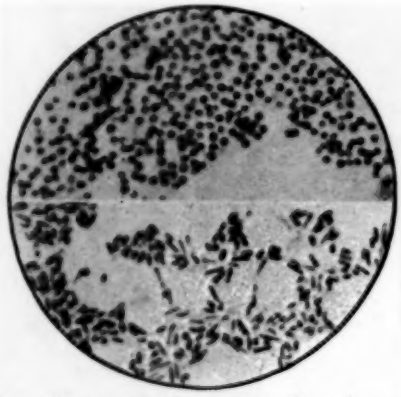
from all parts of the country were infected.

Following the warnings issued by the U. S. Public Health Service, doctors are on the watchout for the disease. To date there have been 430 human cases, with 18 deaths. Any workers in an occupation in which rabbits are skinned, dressed or cut up are especially liable to the infection. Ticks and flies found on horses, cows and sheep may also carry it. About one per cent. of the rabbits on the market are infected but those which have been thoroughly cooked are safe to eat. Workers including cooks and housewives, who have occasion to handle the infected animals are advised to wear rubber gloves. The eradication of the ticks, flies and rabbits that carry the disease is practically impossible.

Since it does not spread from man to man, serious epidemics are improbable but in the country, where it is insect-borne, it is a serious handicap to the farmer who becomes infected during the busy summer season. One attack confers immunity and while there seem to be no serious after effects, it has taken one or two cases a year to recover. So far there is no known cure, though the scientists at the Hygienic Laboratory are working on a preventive serum. No drug has been found to have any special value in treating the disease, so that the only thing that can be done is to put the patient to bed and make him as comfortable as possible.

Recently owners of fox farms in the west, who have millions of dollars invested in the production of silver fox skins for the fur market, became alarmed over the possibility of their $500 foxes becoming infected from the rabbit meat they require for food. Accordingly a plea for information, followed by a sacrificial donation of four magnificent silver foxes, was dispatched to the Hygienic Laboratory. The regal creatures have been fed tularemia-infested rabbits every third day for nearly a month without showing any signs of the disease. Apparently foxes are immune, even though there is conclusive evidence that their relative the coyote is susceptible. As far as is known at the present time domestic rabbits raised in rabbitries have never been found naturally infected.



Two forms of the germ, B. tularense, cause of rabbit fever

The Lister Institute of Preventive Medicine in London desired to have a culture of the bacterium of this strange new disease to add to their germ collection. Dr. McCoy accordingly packed up a virulent tularemia culture, sending with it instructions that it was dangerous stuff, since everyone over here who had handled it had become infected. In the light of this warning, the head curator of the repository of type cultures, (even in scientific institutions British titles are characteristically British) undertook to carry on the experiments with *Bacterium tularense* himself. In one month he was in the hospital. A little later his assistant, who had supervision of his tularemia infected guinea pigs while he was in bed, went to the hospital too. After a third bacteriologist had followed suit, the director of the institution took

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ASTRONOMY

Year's First Comet

The first comet of 1928, which will be known therefore as comet 1928a, has been found by an astronomer named Filipoff at the French Observatory at Algiers, in northern Africa. Announcement of this discovery has just reached the Harvard College Observatory, according to Dr. Harlow Shapley, director.

When discovered, on January 28, the new comet was in the constellation of Gemini, the twins, which is now overhead in the late evenings. It was of the eleventh magnitude, too faint to be seen without telescopic aid, and its position, in the astronomical equivalents of latitude and longitude, was 6 hours 24 minutes and 56 seconds right ascension and 20 degrees 16 minutes north declination. It is reported as having very slow movement, thus indicating that it is at a great distance from the earth. After two more observations have been made, astronomers will be able to compute its orbit and tell whether or not it is likely to become visible to the naked eye.

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New All-American Disease

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administrative charge of the situation and ordered the cultures and guinea pigs destroyed and the laboratory disinfected. He was taking no chances of letting this dangerous American infection get loose.

In all, twenty cases of tularemia have occurred in laboratory workers, including physicians, bacteriologists, entomologists and trained laboratory assistants. To these for the most part unnamed victims of scientific progress, the editors of the American Medical Association have paid the following tribute:

"Americans are prone to laud the enterprise and intrepidity of heroes who do not hesitate to risk their lives in attempts to reach the poles, to conquer the highest altitude, and to penetrate into danger zones of varied sorts. Why shall we not herald with equal pride the glory of those scientific workers who are daily facing unrecognized dangers of the gravest sort in their efforts to conquer insidious diseases? The mantle of distinction should fall on the shoulders of these modest medical explorers, many of whom have suffered severely through chance infection 'in the scientific line of duty'."

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CHEMISTRY

Billion Dollars From Corn Wastes

A billion dollars of new wealth for the Corn Belt, through the annual utilization of its two hundred million tons of corn stalks and twenty million tons of cobs, now wasted, is the promise of engineers and chemists to the American farmer.

How the greatest agricultural waste, corn stalks and cobs, can be made into some three hundred useful products is told in a report to the Engineering Foundation by Prof. O. R. Sweeney of Iowa State College. In a decade or two they will be utilized on a large scale, he predicted.

"Before the many products of promising usefulness could be made even on a small scale in the laboratory," Prof. Sweeney said, "years had to be spent in patient, ingenious, fundamental researches to determine the exact chemical and physical natures of these raw materials and their constituents. Not only agricultural, but also industrial and economic problems had to be solved with the aid of engineering research, supplementing the work of the scientist. Much remains to be done.

"Iowa State College, in the midst of the corn belt, has been a leader in the attack. Knowledge being gotten in the cornfield will be useful also to growers of other grains, peanuts, flax and cotton, who have similar waste materials. Civilized men will be able to continue to feed and clothe the increasing populace and to supply many of their other wants by successful solution of just these problems.

"What does the laboratory offer to industry from these raw materials now wasted? Paper of several grades, papier maché, wallboard and other substitutes for building lumber, substitutes for hard woods used in furniture and finish, rayon, acetic acid, acetone, a sugar that can be used by diabetics, maple sugar flavoring to be combined with cane or beet sugar to make 'maple syrup,' oxalic acid, plastic materials, electrical and heat insulation, and furfural.

"Furfural was a laboratory chemical not many years ago, scarce at $50 a pound. Now it is produced in large quantities at 14 cents. With increasing production, improved methods and development of co-products, even the latter price may be more than cut in half. Furfural is a fluid heavier than water, having many and various uses in plastics, dyes, paint removers, antiseptics, anesthetics, germicides, embalming fluids and motor fuels. It burns in lamps with a more brilliant flame than kerosene and has not the unpleasant odor of the latter.

"If the chemist and engineer and farmer can solve the economic problems, new industries may dot the prairies. Among these problems one of the foremost has been the cheap collection of the stalk and cobs to a few places where they will be subjected to the first steps toward becoming saleable commodities. Special machines have been devised for gathering up the cornstalks in the field, or for cutting the standing corn, husking the ears and shredding the stalks. Another problem is the safe and inexpensive storage of the raw materials throughout the year, in order that the industrial operations may be continuous.

"As contrasted with forests, which, once cut, are not quickly replaced, and commonly in America are not replaced at all, the corn wastes would be produced year after year in great quantities within the same areas. As nearby forests have been consumed, for example, the saw mills and pulp mills have had to move to more and more remote locations from their markets.

"Lest the corn production should decrease, the fertility of the soil must be maintained. It has been learned that this can readily be done by growing soya beans as the 'rotation' crop. The soya bean is a strong nitrifier of the soil. After extracting the oil from the bean, the refuse, including the stalk and meal, can be plowed back in to the soil. The income from the oil, which has many uses, will partially offset the lack of income from corn in the years of change crop. Thus the cycle would become complete by the chemistry of nature, and the energy of the sun would be converted perenially to many uses of man.

"Depletion of forests and of mineral resources and advances in chemistry and engineering will have much to do with the measures of success which may be achieved in turning these agricultural wastes into wealth. At best, it will take much time, research and development.

"More than research, engineering, industrial development and financing will be required. Useful and valuable new commodities may be produced, but successful production at a fair price may not bring economic success. As has well been said: The fight for recognition for a new product is almost as hard to wage as is the fight for a new idea."

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ARCHÆOLOGY

Rare Mongolian Trophies

Important discoveries won by the Russian explorer, Prof. Peter K. Kozloff, in three years of hard journeying through deserts and mountains of Mongolia have been completely overshadowed by the misleading report that he found the tomb of the famous Mongol chief, Ghenghis Khan.

In a communication to Soviet representatives in Washington, Prof. Kozloff says that his last expedition into Mongolia brought to Leningrad 3,000 specimens of desert plants, bones of rare animals, Buddist statues from buried cities, and other objects which are being studied by the Russian Academy of Sciences.

Traveling through the mountain regions of Khangay, the explorers found an ancient tomb where 30 generations of an Asiatic tribe were carefully buried.

In the ruins of a Chinese military city in a mountain gorge they found a remarkable stone tablet saying that here 600 years ago was a fortress founded by Kublai Khan in remembrance of an insurrection he had put down.

In the hills of the north Gobi Desert they discovered a graveyard of ancient animal bones lying in thick nests, as Dr. Kozloff calls them. Bones believed by the explorers to be those of the hornless rhinoceros, the giraffe, boar, and other species of great interest to zoologists were taken back to Leningrad.

Returning to the dead city of Khara Khoto, which he visited in the depth

(*Just turn the page*)

RADIO

Transparent Metal for Radio

Sheets of metal such as iron, gold or platinum so thin that ordinary type can be read with ease through them, may find use in radio and phonograph reproducers. Ordinary diaphragms for this purpose are so heavy that they dampen some of the overtones and so coarsen the sounds. These thin metal sheets are the result of research by Dr. Carl Müller, of the Charlottenburg Laboratory, near Berlin. His method of preparing them is to electroplate the metal on the surface of some soluble substance, such as rocksalt, and then dissolve away the support. A ring of thicker metal can be used to support the films, of which two and a half million would have to be piled to make a stack an inch high.

Such films have been made of

(*Just turn the page*)

ENTOMOLOGY

FRANK EUGENE LUTZ

Physiological Entomologist

The conventional picture of an entomologist used to be one of an elderly but spry individual actively pursuing a fleeing butterfly or bee with a long-handled net. Dr. Frank E. Lutz, curator of insects at the American Museum of Natural History, can certainly not be called elderly, for he is not yet fifty. But popular notions are in error on that point anyway; most entomologists are inoculated with their particular virus while they are boys, and the disease is chronic and incurable. Its outstanding symptoms are the aforementioned spryness of limb, together with a quick sharpening of vision and a burrowing curiosity of mind. Dr. Lutz's is a typical and well-developed case.

But entomologists do not always give chase to their prey. Sometimes they make the insect come to them at night, taking advantage of the proverbial inability of the moth to keep away from the candle-flame. Dr. Lutz goes the scientific candle-burning trick one better. He lures his victims with invisible light. In the private laboratory which his friend Alfred L. Loomis has built at Tuxedo, N. Y., there is a window with a lamp behind it. At night the lamp frequently burns, though human passers-by would not see it, for its light is the invisible radiation we know as ultra-violet rays. But insect fliers-by do see it, and they come and cluster about the window as though it were agleam with light, and the

(*Just turn the page*)

SEISMOLOGY

Records Minor Quakes

A new seismograph that records the less violent tremblings of the earth's crust undetectable by the human sense is now installed and in operation at Stanford University. As a part of the fundamental plan for an intensive study of the California earthquake situation, this station has been established by the business men of San Francisco and Oakland as one of four, which are so located as to record the local shocks in the vicinity of that metropolitan center. The central station is at the University of California and the auxiliaries at Lick Observatory, Stanford University, and the California Academy of Science in Golden Gate Park. The instruments and arrangement are patterned on the plan of observation inaugurated by the Carnegie Institution of Washington for southern California to keep track of the minute earthquakes that are constantly occurring and which indicate the development of strain that leads to the greater ones. Four little shocks were recorded recently at Stanford on the new instruments. There is no occcasion for alarm, however, since this is merely the normal activity of the earth's crust, not only in California

(*Just turn the page*)

HYGIENE

Alcohol Chief Bootleg Poison

The principal poison in post-prohibition liquor is alcohol, in the estimation of Dr. H. V. Atkinson of the department of pharmacology at the State University of Iowa.

"An examination of the evidence, which from the nature of the problem is far from exact," he declared in a recent report to the American Pharmaceutical Association, "seems to prove that most cases of poisoning as a result of drinking bootleg liquor are due to the ingestion of an overdose of ethyl alcohol."

Dr. Atkinson divides liquor, as it is known today, into three classes: Properly made whisky and brandy, synthetic liquors, and moonshine or home-brew liquors.

The first class is in all respects the same as carefully made liquors in pre-prohibition days and has never been seriously suspected of containing anything toxic besides the alcohol that makes people want to drink it, stated the chemist.

"Acute poisoning as the result of drinking bouts," he added, "has long been known and is not surprising since the concentration of alcohol in the blood depends on the concentration of the alcohol in the liquor used

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Records Minor Quakes

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but also in any region where earthquakes have occurred. Vibrations of the solid earth are as unknown as were those of the atmosphere before radio showed them up. Protection against earthquakes will not be achieved unless we secure a better understanding of their development during the long periods that elapse between severe shocks.

The seismograph installed at Stanford was placed on a ledge of rock that was selected because of its apparent solidity, but the first records showed an extraordinary number of microscopic vibrations, not exactly like those of earthquakes. They were most continuous on windy days and are attributed to a large oak tree which stands about fifty feet away from the instrument piers. The roots evidently extend into the crevices of the rocks, where they find water during the long dry season, and the swaying of the tree shakes the massive ledge of sandstone. The oak will probably have to be cut, to the regret of those who because of its beauty sought to include it in the Seismograph Park which the Trustees of Stanford have set aside in perpetuity.

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Alcohol Chief Bootleg Poison

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and the rapidity of ingestion. The margin between the concentration of alcohol in the blood required to produce intoxication and that causing collapse is not great."

Poisoning from synthetic liquors may be due to any one of a large number of substances used to denature alcohol. Wood alcohol is the guilty agent in most cases but poisoning has been reported from such compounds as nitrobenzine. These are rare, however, the chemist declared, or have escaped detection.

The third class contains those that are fermented and distilled surreptitiously. The great drawback to this type of liquor is the inclusion for reasons of financial profit of "heads" and "tails," the first and last runnings respectively of the distilling. Moonshiners in the old days learned from sad experience that the heads and tails should be thrown away. The former contain certain chemical compounds deleterious to the human system while the latter contain fusel oils, too widely discussed to need explanation. Continued use of badly made moonshine has been shown to produce bad effects on the kidneys of animals.

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Physiological Entomologist

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patient watcher within traps such of them as he desires.

This is only one of the many lines of inquiry into the ways of insects which Dr. Lutz carries on. His main interest, indeed, is in the living insect, not in the skewered specimen in the museum tray. The physiology of insects, and the workings of those strange and complex sets of reflexes that constitute their minds, are his chief joy. Some day he will write a thick book on the subject, and it will be fascinating reading.

Like almost all good New Yorkers, Dr. Lutz was born somewhere else: at Bloomsburg, Pa. Like all sensible New Yorkers, he doesn't live in New York now, but keeps his family at Ramsey, N. J. Like many New Yorkers who are in scientific work, he is giving the metropolis the benefits of an education acquired elsewhere: an A. B. from Haverford and an A. M. and a Ph. D. from the University of Chicago.

Aside from his more critical researches in the insect world, Dr. Lutz has done for the swarming crowds of city dwellers who escape to recreation grounds and state parks on week-ends something which may well stand as a higher monument to his memory than all his scientific work. This is the establishment of "nature trails" in the Palisades State Park—marked paths along which every tree and bush and toadstool and anthill and bird's nest has a concisely written label giving the main facts about it, so that he who walks may read. This idea has been adopted all over the country; the biggest recruits to the movement are the U. S. National Parks. Millions of folk who have never heard of Dr. Lutz and never will, are beneficiaries of this one simple but far-reaching idea of his.

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An automobile that can be run sideways has been invented to make parking easier.

A simple piece of apparatus which tests the alignment of automobile wheels has been invented.

A new steel which is hard on the surface and soft inside is said to be cheaper than alloys in use.

One of New York's newest skyscrapers burns enough coal in a day to heat four average sized homes all winter.

Rare Mongolian Trophies

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of the desert in 1909, the famous Russian explorer brought away ceramic ware of different periods, from heavy vessels for carrying water to delicate, beautifully wrought porcelain. Here, one of the members of the expedition unearthed a series of long buried human figures, finely made and with cleverly expressive faces. Prof. Kozloff himself says that his finds at Khara Khoto are a significant supplement to those he brought out of the dead city in his earlier excavations. All the walls and structures of the city are now described in detail, he states, and plans have been drawn of the ruins.

Insects and birds entirely unknown were brought back by the expedition, as well as plants from the waterless region of the Gobi Desert. These plants so resistant to drought will be of especial interest to Turkestan and other arid regions, Prof. Kozloff believes.

The rumor that he discovered the lost tomb of the Mongol chief Ghenghis Khan is regretted by Prof. Kozloff. The real fact is that as he crossed the mountains near Khara Khoto he came upon a mausoleum of some Mongolian Khan whose name could not be learned. The tomb was of great age and looked important, but after the long hot summer's work in Khara Khoto, the expedition was returning with light equipment and could not stay to excavate.

Prof. Kozloff has been planning a new expedition to this remote and still little known region of the world.

Science News-Letter, February 11, 1928

Transparent Metal For Radio

(*Continued from page* 85)

iron, nickel, gold, silver and platinum, and it is found that although the nickel is much less transparent to visible light than gold, it readily transmits the shorter ultraviolet rays. The films are very elastic, and will bulge out for as much as a tenth of their diameter without breaking. Another curious thing about them is their electrical conductivity. Electric current is carried only along the surface of a wire, and as these are practically all surface, a strip of film containing no more metal than a round wire one hundredth of a millimeter in diameter—scarcely visible to the naked eye—will carry enough current to light several lamps. If the same current were passed through the wire, it would be instantly melted.

Science News-Letter, February 11, 1928

SOCIOLOGY

"History" vs. Truth

Quotation from STANDARDIZATION OF ERROR—Vilhjalmur Stefansson—Norton and Co.

When we got into the late War, we suddenly discovered that most of our school histories were anti-British. Many of them were forthwith charged to pro-British without a murmur from any one, except a few people who (we all agreed, as soon as they began to protest) were either pro-Germans or Pacifists. But the War, after we got into it, was so short that there was not time to oust all the anti-British propaganda from the texts, before it was over. I had the instructive experience of being in a city where a violent newspaper controversy sprang up between correspondents, some of whom favored anti-British history but most of whom favored pro-British. The ground of the pro's was that we ought to stand by our former allies, that there might soon be another war, and that we should bring up the younger generation strong for English-speaking unity, because that was the natural basis of the coming alignment. Some argued specifically that we might be able to annex Canada if we used the same sort of histories as the Canadians and therefore grow up to the same beliefs. Even the Hearst papers, which then opposed this view and anything else that seemed to favor the British, have since come out for the principle and now advocate an English-speaking union.

The voices, on the other hand, which suggested an impartial history were few and weak. Thus did what

(*Just turn the page*)

PSYCHOLOGY

Indians Slow But Sure

The red man is rapidly taking over the white man's civilization, but he has not tuned himself up to the speed of present day America. This is indicated by mental tests given to 120 Indian children on the Yakima reservation.

Results of the test, just reported to the *Journal of Abnormal and Social Psychology* by Otto Klineberg, of Columbia University, show that in tests where the children were to fit together the pieces of a puzzle the Indian children averaged 11 moves in a minute as compared with 17 moves a minute by white children.

"In extreme cases the difference is striking," Mr. Klineberg said. "The white boy jumps at the puzzle. He tries the piece here, there, everywhere. When he strikes at what

(*Just turn the page*)

PHYSIOLOGY

A Cardiographic Valentine

Your Valentine looks for a message
That's honest, without any sham.
The best you can possibly send her
Is simply a cardiogram.

And should she be expert in reading
The story such messages tell,
The picture will have, besides fondness,
An eugenic value as well.

If flutter or block should be shown,
Or even so much as suspected,
Your hopes will depart to the grave;
You'll know right away you're rejected.

Should your heart mind all of its waves,
Its P's and its Q's and the rest,
She'll know, beyond fear of denial,
How true is the heart in your chest.

So, even in Spain or Siam,
Tell all of your love, not the half;
Just send her a cardiogram
I'll take on my cardiograph.

—*Richard Ashman*

Science News-Letter, February 11, 1928

PHYSICS

Use Vacuum Tube Backwards

Using a radio vacuum tube backwards in order to reduce the voltage and increase the power at the same time is the trick described to the Institute of Radio Engineers. In a paper by Frederick E. Terman, of Stanford University, California, it was stated that the plate and the grid of a tube could be made to interchange their functions.

In the ordinary vacuum tube, as used in the usual receiving set as an amplifier, the feeble electrical impulses that form the signals are fed into the grid. The electrons that travel across from the filament to the plate produce an electrical current, much larger that the current entering the tube, but varying in conformity with it. However, the outgoing current is also higher in voltage, as well as more powerful, than the incoming.

Mr. Terman has found, however, that the voltage can be reduced by interchanging the plate and grid. He feeds in the current to be amplified to the plate instead of the grid, and takes it out from the grid.

"It is relatively simple," he states, "to construct an inverted vacuum tube with wide clearances between the plate and the rest of the tube, so

(*Just turn the page*)

PSYCHOLOGY

Men More Unhappy

It's a sadder world for men than for women—if 168 Canadian college students who have taken a test of emotional stability are fair samples of the sexes.

The students answered a long list of questions, such as "Can you do good work while people are looking on?" "Do ideas run in your head so that you cannot sleep?" and "Is it easy to get you cross and grouchy?"

Men appear to be more serious and unhappy than women, according to Dr. J. W. Bridges, psychologist of McGill University, who conducted the investigation, and who has just reported his results. Contrary to popular notion, men are more troubled by hearts thumping from excitement and nervousness than women.

On the other hand, Dr. Bridges reports that women are more subject to dreaming and day dreaming, are more abnormal in their sex life, have more fears and worries, are more undecided, more sensitive to pain and other unpleasant experiences. They are perhaps not such "good mixers" as men, since they are more bashful and have greater difficulty in making friends.

Students who are superior in academic work have more psycho-neurotic symptoms than average and inferior students, he found.

Science News-Letter, February 11, 1928

ANTHROPOLOGY

Egypt Cradle of Civilization?

Through thousands of years, prehistoric men and women wandered homeless up and down the River Nile, and as they traveled about they lost or cast aside innumerable stone axes and hammers that were their chief tools and weapons. Now, those stones, long preserved in the terraces along the Nile, have been sought for a thousand miles up and down the river valley, by two geologists, and as a result man's civilization in Egypt is traced back to its beginning, thousands of years ago.

The expedition which has just reported this remarkable accomplishment is known as the Prehistoric Survey and was sent out by the Oriental Institute of the University of Chicago. The geologists who surveyed the region are Dr. K. S. Sandford and W. J. Arkell, both of Oxford University.

In the course of the ages, terraces have formed, like gigantic steps, rising back from the Nile on each side of the river, and it was in these different terraces, belonging to different

(*Just turn the page*)

WHAT PRICE KNOWLEDGE?

In ages of the past those who sought it—found it

But it was often expensive and limited to a few

What is it, then, that distinguishes this age of amazing scientific progress from the slowly moving ages of the past?

Is it not because new information, valuable to science, is no longer confined to its source?

Is it not because new discoveries are known almost immediately after their accomplishment?

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Egypt Cradle of Civilization?

(*Continued from page* 87)

periods of time, that the geologists found different types of stone tools characteristic of certain stages of man's development toward civilization.

The oldest tools are pronounced similar to those used by stone age men of Europe during the age called Chellean. Europeans who made such tools lived from 50,000 to 100,000 years ago, but the stone age Egyptians may have made their tools at an earlier time, it is said.

Whether or not Egypt was the cradle of man's physical development into a human being, Dr. Sandford's report shows that Egypt must have been one of the earliest homes of man. And the evidence indicates that it was most probably in Egypt that man first slowly developed into a creature of civilization.

"Of all regions in the world," Dr. Sandford states, "Egypt, and particularly upper Egypt, offers an opportunity for discovering man's past independently of all evidence obtained in Europe. If the evidence agrees with that of Europe, so much the better. If it does not we would incline to rely upon it none the less."

Science News-Letter, February 11, 1928

Use Vacuum Tube Backwards

(*Continued from page* 87)

that potentials of hundreds of thousands of volts can be applied at the plate, while the effect of this high voltage stepped down in almost any desired ratio is obtained in a low potential circuit."

The chief use of the inverted tube, Mr. Terman stated, is in studying the waves formed by high voltage alternating currents, using an oscillograph. In this way, the current variations can be studied without consuming any appreciable amount of the current. No immediate use of the device in ordinary radio sets is foreseen.

Science News-Letter, February 11, 1928

During a recent storm in France the rain contained sand that had blown from Africa.

Doctors of the late Stone Age practised surgery with considerable skill and success.

The cat flea and dog flea are distinctly different, though both infest both cats and dogs.

"History" vs. Truth

(*Continued from page* 87)

we believe to be the sound common sense of the people manifest itself. For next after patriotism comes a right world outlook. We must know in advance what country to favor in time of trouble. And how can the needed unanimity be secured in a democracy except by teaching the youngsters to like the right country so that they may vote correctly when they later come to decide tariffs, treaties, and wars?

The importance of discretion in history teaching was once brought forcibly to my attention when I was spending a summer in northern Vermont, and found in use three miles away across the Canadian line in Quebec, school texts in which the War of 1812 differed so much from the same war in the Vermont histories that you would hardly believe it was the same war. You can readily see how wise that was on both sides. Imagine the discord that would be introduced into the teaching of Canadian patriotism if they used Vermont histories, and similarly what havoc a Canadian history could work, if tossed into our school system like a stone into delicate machinery. Nor is there any half-way course possible. If you were to cut out all the contradictions, there would be little left of that particular war; neither would the leavings be any good for inculcating patriotism or other moral virtues into either Canadians or Americans. Obviously, things had best remain as they are.

Science News-Letter, February 11, 1928

Indians Slow But Sure

(*Continued from page* 87)

seems to be its proper place, he leaves it there, and flies to the next. He completes the tests in 66 seconds, but he has made 14 errors in the process.

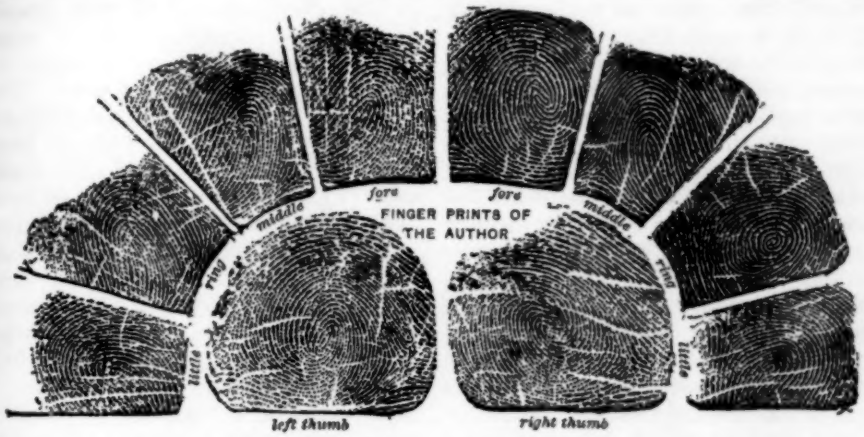
"The Indian boy moves slowly, deliberately. He seems to think each move twice over. You have said to him also 'as quickly as possible,' but that evidently means little to him. He takes 137 seconds to complete the tests. A poor performance apparently, but he has not made a single false move."

Dr. Klineberg is now investigating whether white children would improve in accuracy if they imitated the Indian child's deliberate manner.

Science News-Letter, February 11, 1928

A Nuremberg man who invented a ticking clock, in 1840, was accused of witchcraft by his wife and his neighbors.

Classics of Science: Finger-Prints



One great advantage of the rude A. L. W. system is that it can be applied, with little risk of error, to impressions that are smudged or imperfect; it is therefore very useful so far as it goes. Thus it can be easily applied to my own finger prints on the title-page, made as they are from digits that are creased and roughened by seventy years of life, and whose impressions have been closely clipped to fit them into a limited space—Galton

Francis Galton was the first to make a thorough study of the pressure-ridges on the fingers as a means of identification, and to devise a complete, yet simple, classification for them. The amateur detective (and who is not?) will enjoy taking his own finger-prints and those of his friends and trying out the classification scheme. An ordinary stamp-pad and news-print paper will give satisfactory impressions.

FINGER PRINTS by Francis Galton, F.R.S., etc. London, 1892.

Ridges of the Hands

The palms of the hands and the soles of the feet are covered with two totally distinct classes of marks. The most conspicuous are the creases or folds of the skin which interest the followers of palmistry, but which are no more significant to others than the creases in old clothes; they show the lines of most frequent flexure, and nothing more. The least conspicuous marks, but the most numerous by far, are the so-called papillary ridges; they form the subject of the present book. If they had been only twice as large as they are, they would have attracted general attention and been commented on from the earliest times. Had Dean Swift known and thought of them, when writing about the Brobdingnags, whom he constructs on a scale twelve times as great as our own, he would certainly have made Gulliver express horror at the ribbed fingers of the giants who handled him. The ridges on their palms would have been as broad as the thongs of our coach-whips.

Let no one despise the ridges on account of their smallness, for they are in some respects the most important of all anthropological data. We shall see that they form patterns, considerable in size and of a curious variety of shapes, whose boundaries can be firmly outlined, and which are little worlds in themselves. They have the unique merit of retaining all their peculiarities unchanged throughout life, and afford in consequence an incomparably surer criterion of identity than any other bodily feature. They may be made to throw welcome light on some of the most interesting biological questions of the day, such as heredity, symmetry, correlation, and the nature of genera and species. A representation of their lineations is easily secured in a self-recorded form, by inking the fingers in the way that will be explained, and pressing them on paper. There is no prejudice to be overcome in procuring these most trustworthy sign-manuals, no vanity to be pacified, no untruths to be guarded against. . . . .

The embryological development of the ridges has been studied by many, but more especially by Dr. A. Kollmann, whose careful investigations and bibliography should be consulted by physiologists interested in the subject. He conceives the ridges to be formed through lateral pressures between nascent structures.

The ridges are said to be first discernible in the fourth month of the fœtal life, and fully formed by the sixth. In babies and children the delicacy of the ridges is proportionate to the smallness of their stature. They grow simultaneously with the general growth of the body, and continue to be sharply defined until old age has set in, when an incipient disintegration of the texture of the skin spoils, and may largely obliterate them, as in the finger prints on the title-page. They develop most in hands that do a moderate amount of work, and they are strongly developed in the foot, which has the hard work of supporting the weight of the body. They are, as already mentioned, but faintly developed in the hands of ladies, rendered delicate by the continual use of gloves, and lack of manual labour, and in idiots of the lowest type who are incapable of labouring at all. When the skin becomes thin, the ridges simultaneously subside in height. . . .

The Patterns

The ridges of the palm of the hand, run athwart the fingers in rudely parallel lines up the last joint, and if it were not for the finger-nail, would apparently continue parallel up to the extreme finger-tip. But the presence of the nail disturbs their parallelism and squeezes them downwards on both sides of the finger. Consequently, the ridges that run close to the tip are greatly arched, those that successively follow are gradually less arched until, in some cases, all signs of the arch disappear at about the level of the first joint. Usually, however, this gradual transition from an arch to a straight line fails to be carried out, causing a break in the orderly sequence, and a consequent interspace. The topmost boundary of the interspace is formed by the lowermost arch, and its lowermost boundary by the topmost straight ridge. But an equally large number of ducts exist within the interspace, as are to be found in adjacent areas of equal size, whose mouths require to be supported and connected. This is effected by the interpolation of an independent system of ridges arranged in loops, or in scrolls, and this interpolate system forms the "pattern." Now the existence of an interspace implies the divergence of two previously adjacent ridges, in order to embrace it. Just in front of the place where the divergence begins, and before the sweep of the pattern is reached, there are usually one or more very short cross-ridges. Their effect is to complete the enclosure of the minute triangular plot in question. Where there is a plot on both sides of the finger, the line that connects them serves as a base line whereby the pattern may be oriented, and the position of any point

(*Just turn the page*)

Finger-Prints

(*Continued from page* 89)

roughly charted. Where there is a plot on only one side of the finger, the pattern has almost necessarily an axis, which serves for orientation, and the pattern can still be charted, though on a different principle, by dropping a perpendicular from the plot on to the axis, in the way there shown.

These plots form corner-stones to my system of outlining and subsequent classification; it is therefore extremely important that a sufficient area of the finger should be printed to include them. This can always be done by slightly *rolling* the finger, the result being, in the language of map-makers, a cylindrical projection of the finger. . . .

The words right and left *must be avoided* in speaking of patterns, for the two hands are symmetrically disposed, only in a reversed sense. The right hand does not look like a left hand, but like the reflection of a left hand in a looking-glass, and vice versa. The phrases we shall employ will be the *Inner* and the *Outer;* or thumb-side and little-finger side.

There need be no difficulty in remembering the meaning of these terms, if we bear in mind that the great toes are undoubtedly innermost; that if we walked on all fours as children do, and as our remote ancestors probably did, the thumbs also would be innermost, as is the case when the two hands are impressed side by side on paper. Inner and outer are better than thumb-side and little-finger side, because the latter cannot be applied to the thumbs and little fingers themselves. The anatomical words radial and ulnar referring to the two bones of the fore-arm, are not in popular use, and they might be similarly inappropriate, for it would sound oddly to speak of the radial side of the radius.

The two plots just described will therefore be henceforth designated as the Inner and the Outer plots respectively, and symbolized by the letters I and O.

The Outlines

The next step is to give a clear and definite shape to the pattern by drawing its outline. Take a fine pen, pencil, or paint brush, and follow in succession each of the two diverging ridges that start from either plot. The course of each ridge must be followed with scrupulous conscientiousness, marking it with a clean line as far as it can be traced. If the ridge bifurcates, always follow the branch that trends towards the middle of the pattern. If it stops short, let the outline stop short also, and recommence on a fresh ridge, choosing that which to the best of the judgment prolongs the course of the one that stopped. These outlines have an extraordinary effect in making finger markings intelligible to the untrained eye. What seemed before to be a vague and bewildering maze of lineations over which the glance wandered distractedly, seeking in vain for a point on which to fix itself, now suddenly assumes the shape of a sharply defined figure. Whatever difficulties may arise in classifying these figures, they are as nothing compared to those experienced in attempting to classify unoutlined patterns, the outlines giving a precision to their general features which was wanting before.

After a pattern has been treated in this way, there is no further occasion to pore minutely into the finger print, in order to classify it correctly, for the bold firm curves of the outline are even more distinct than the largest capital letters in the title-page of a book. . . .

The A. L. W. Classification

The classification into Arches, Loops, and Whorls is based on the degree of curvature of the ridges, and enables almost any pattern to be sorted under one or another of those three heads. There are a few ambiguous patterns, and others which are nondescript, but the former are uncommon and the latter rare; as these exceptions give little real inconvenience, the classification works easily and well.

Arches are formed when the ridges run from one side to the other of the bulb of the digit without making any backward turn or twist. Loops, when there is a single backward turn, but no twist. Whorls, when there is a turn through at least one complete circle; they are also considered to include all duplex spirals. . . .

The Arch-Loop-Whorl, or, more briefly, the A. L. W. system of classification, while in some degree artificial, is very serviceable for preliminary statistics, such as are needed to obtain a broad view of the distribution of the various patterns. A minute subdivision under numerous heads would necessitate a proportional and somewhat overwhelming amount of statistical labour. Fifty-four different standard varieties are by no means an extravagant number, but to treat fifty-four as thoroughly as three would require eighteen times as much material and labour. Effort is economised by obtaining broad results from a discussion of the A. L. W. classes, afterwards verifying or extending them by special inquiries into a few of the further subdivisions.

The divergent ridges that bound any simple pattern admit of nine, and only nine, distinct variations in the first part of their course. The bounding ridge that has attained the summit of any such pattern must have arrived either from the Inner plot (I), the Outer plot (O), or from both. Similarly as regards the bounding ridge that lies at the lowest point of the pattern. Any one of the three former events may occur in connection with any of the three latter events, so they afford in all 3x3, or nine possible combinations. It is convenient to distinguish them by easily intelligible symbols. Thus, let *i* signify a bounding line which starts from the point I, whether it proceeds to the summit or to the base of the pattern; let *o* be a line that similarly proceeds from O, and let *u* be a line that unites the two plots I and O, either by summit or by base. Again, let two symbols be used, of which the first shall always refer to the summit, and the second to the base of the pattern. Then the nine possible cases are—*uu, ui, uo; iu, ii, io; ou, oi, oo.* The case of the arches is peculiar, but they may be fairly classed under the symbol *uu*. . . .

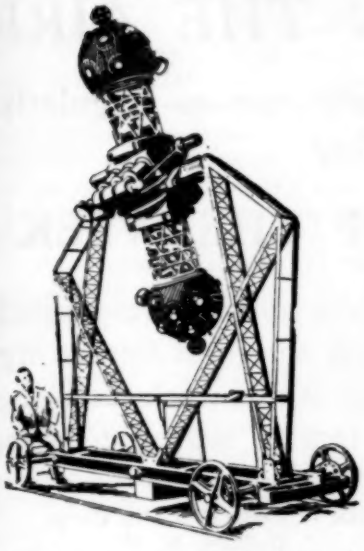
It may be asked why ridges are followed and not furrows, the furrow being the real boundary between two systems. The reply is, that the ridges are the easiest to trace; and, as the error through following the ridges cannot exceed one-half of a ridge-interval, I have been content to disregard it. I began by tracing furrows, but preferred the ridges after a trial.

Sir Francis Galton was born in Warwickshire, England, February 16, 1822, and died at Haslemere January 17, 1911. He studied medicine, but decided not to enter the profession, graduated from Cambridge University at 21, and until 1860 devoted himself to travel, especially in Africa, still a generally unexplored continent. His next interest was the weather, and in 1863 he published "Meteorographica" giving the results of his observations. In 1869 his "Hereditary Genius, its Laws and Consequences" opened the field of researches on human heredity. Always interested in anthropology and anthropometry, Galton became enthusiastic about finger prints in 1888 while studying the Bertillon measurements newly introduced into prison records in France. Between the ages of 64 and 73 he was actively engaged on the study and classification of this method of identification. Galton was knighted in 1909, at the age of 86, only two years before his death.

Say you saw it advertised in the SCIENCE NEWS-LETTER

Artificial Stars

By James Stokley



Imagine a very clear night sky—the sort of a sky that one sees from a high mountain, far from the lights and dust of a city. Unlike the night sky ordinarily seen by city dwellers, the Milky Way can be seen down to the horizon and thousands of stars gaze down on the observer. And as imagination can have full reign, imagine that by some divinely conferred power, this sky can be altered at the will of the observer. It can be made to appear as the sky would be seen from any part of the earth, from the north pole to the south, or as it has appeared thousands of years ago, or will appear in the distant future.

Of course, such things cannot be done with the real sky, but precisely the same effect can be obtained with a wonderful new instrument that has been installed in a number of European cities. A few years ago travellers returning from Germany told of this instrument—the planetarium—which was on exhibit in the great Science Museum of Munich. Since then a dozen German cities, including Berlin, Hamburg and Düsseldorf, have installed them as educational exhibits; Vienna has also obtained one, while others have been ordered for Rome and for Moscow.

The instrument, which is the result of the ingenuity of Dr. W. Bauersfeld, one of the engineers at the Carl Zeiss Optical Works at Jena, is a glorified stereopticon, or magic lantern. It is set up in the center of a 90-foot dome lined with white cloth. A battery of over a hundred lenses projects the images of the stars on the dome. These lenses are located around the two large bulbs at each end of the instrument, as shown in the illustration. Motors provide for turning the instrument to simulate the effect of the earth's rotation, while other motors turn it another way, so as to bring into position the stars seen from other latitudes. In the cylindrical part of the machine are projectors for the sun, the moon, and the five naked eye planets. An extremely accurate mechanism moves these planet projectors so that their images on the dome closely duplicate the motions of their celestial prototypes. But motions which take years to be completed in the heavens, can be run through in a few minutes with the planetarium, thereby explaining their motion far better than could thousands of words of lecturing.

When the first planetarium will be installed in the United States is problematical, but it will probably be in the near future. Though the complete installation in America would cost something like $200,000, including the building, as an educational exhibit it is unequalled. And in Germany, where small admission fees are charged, they have gone far towards paying for themselves. Doubtless the same could be done in the United States.

Science News-Letter, February 11, 1928

AGRICULTURE

Social Self-Preservation

Quotation from THE HARVEST—Liberty Hyde Bailey—Macmillan.

Even as a commercial question, we cannot avoid the necessity of keeping the farmer an enthusiastic producer, if we look any distance into the future. I have not been able to alarm myself over the supposed approaching calamities due to overpopulation of the earth; but if Malthusianism holds (as taught by the new school) then the obligation to increase production is commanding and inescapable and it becomes the major agricultural problem.

Along with this necessity, we must make it more and more unpopular for all kinds of exploiters to skin the earth. We must save the natural produce and safeguard it, protect the streams and the lands, curb land-grabbers, avoid wanton waste of fertility and materials, the locking up of areas and resources for personal greed, and discourage all breeds of piracy. In those days there will be few pirates but many poets.

Science News-Letter, February 11, 1928

Fishes sometimes get sea-sick from train travel.

NATURE RAMBLINGS

By Frank Thone

Tufted Titmouse

Go into some patch of open hardwood timber where the snow still lies under the partial shadow of the trees. Walk quietly and don't talk too much. It's likely you'll hear him first: "Pe-to! Pe-to! Pe-to!" loudly and without fear, like a bluejay. Some call him "Peter-bird" because of that call.

Presently you'll see him, or perhaps a pair or even a little flock, playing about alone or mingled with chickadees, waxwings or woodpeckers. Tufted titmice, or tomtits, are sociable birds, and will make friends with anything in feathers that does not try to bully them. When anything happens that excites them or makes them a trifle suspicious, they sound a second call: "De-de-de-de-de." The "Pe-to" note is their song.

The tomtit is a trim and attractive looking chap. His figure is quite similar to that of his cousin the cedar waxwing, except that it is considerably smaller. Like the waxwing, he has a crest, and again like the waxwing he shares with his mate the privilege of this ornament. There is no need to confuse the two relatives, however. Not only is the tomtit smaller than the waxwing, he isn't nearly so elegant in the matter of clothes. The black eyebars, and especially the sophisticated bits of yellow trimming on wing and tail-edge, that distinguish the waxwing, are lacking in the tomtit. Not that he's dowdy or shabby. Far from it. While his coat is a slatier, soberer affair than the waxwing's garment, with its exquisite nuances of brown, the tomtit shows you he's no Quaker by a dash of red—but not so wide nor so bright as to be ungenteel—across his lower breast and belly. Taken all round, a most bright and attractive chap to have on one's calling list.

Science News-Letter, February 11, 1928

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SCIENCE SERVICE
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ICTHYOLOGY

Snails Enemies of Fish

The humble pond snail has been indicted as one of the criminals whose activities have interferred with the peace and welfare and the family life of our fresh water fishes. Ichthyologists generally have been unable to explain why so few of the hundreds of thousands of eggs laid by each female among the fresh water fish ever reach maturity.

In a life history study of the long-eared sunfish carried on at the Indiana University Biological Station at Winona Lake, Indiana, observations were made each day of the troubles of a vigilant male sunfish trying to guard his nest with its precious eggs.

Long Ear, who is rather long on pugnacity, had very little trouble with the larger fish. They had seemed to have learned their lesson of the purpose and use of the Long Ear's fin spines and remained at a respectful distance. Minnows lingered in a persistent swarm and darted into the nest every time the warrior's attention was diverted but their activities were more of a nuisance than a vital menace.

The greatest difficulty the harassed father sunfish had was the insidious advance of the tank corps of snails. The sunfish could not kill the snails because of their protective shells but had to pick them up and carry them away from the nest one at a time. But by the time he was transporting one, half a dozen others would crawl in among the eggs and eat their fill.

Several thousand eggs and a few snails were put in a bucket over night. In the morning all the eggs had disappeared and an examination of the snails' stomachs did not leave even a scientific doubt as to where they had gone.

Science News-Letter, February 11, 1928

HYGIENE—EDUCATION

University for Tuberculous

An international university in the Swiss Alps is being urged, to aid students who are trying to complete their education, while they fight tuberculosis. There are said to be in Europe 15,000 of these tuberculous students who are attending school in unfavorable climates.

A university sanatorium for Swiss student-patients has been in existence for five years at Leysin. A committee of international student associations has worked out a plan to turn this university into an international institution at Davos. The proposed Alpine university would be financed by contributions from the governments whose people would benefit by the project.

Science News-Letter, February 11, 1928

PSYCHOLOGY

Introvert and Extravert

By TRIGANT BURROW

I am not in sympathy with the implication in the discrimination of types demarcated as "introvert" and "extravert." These terms imply, as they are meant to imply, an essential difference of type rather than a circumstantial difference of reaction. In general the extravert is rather approvingly regarded in the light of a "jolly good fellow," as contrasted with the introvert whose disaffectivity, on the contrary, tends to be regarded with an undisguised slant. As if the jolly good-fellowship of the hysterical type, with all its aggressiveness and ebullience, were not as truly a substitutive alternative resultant upon repression as is the reaction of his more silent, ingrown confrère of the opposite type! As if the affable, effervescent type were not as truly "shut-out" as his psychological vis-à-vis is "shut-in"! Psychiatry has a great deal to say about the shut-in type of personality but it has nothing to say about the shut-out type of personality. Yet of the two the latter is by no means a less serious form of dissociation, and certainly it is by far the more widespread in its results.—Quotation from *The Social Basis of Consciousness—Harcourt Brace.*

Science News-Letter, February 11, 1928

OPHTHALMOLOGY

Sky Glare Cut By Glasses

A new type of dark glasses for outdoor wear at tennis, golf and other sports, and said to be especially useful for auto drivers at night when meeting cars with glaring headlights, has been produced in the optical works of the Zeiss firm at Jena. The basis for the new eye protection consists of two wedge-shaped pieces of glass fused together. The upper member of the pair is made of a dark, gray-brown glass, while the lower part is clear and uncolored. Goggles made from this material are thus very dark at the top, shading off gradually into clear glass at the lower edge. This arrangement cuts off the glare of the sky, while permitting an unclouded view of the ground. Motorists, encountering glaring headlights, simply duck their heads a little and look through the tops of their goggles until the offending car has passed, when they again make use of their normal vision through the lower parts of the glasses.

Science News-Letter, February 11, 1928

HYGIENE

Bright Boys Best Athletes

The boys that win scholarships to Oxford and Cambridge are not "greasy grinds" interested in trigonometry and Latin alone, but are as good athletes as they are scholars, recent investigations show.

Dr. A. H. Mumford, medical officer of the Manchester Grammar School, recently reported to the Royal Anthropological Institute that boys winning first class honors exceeded the average in acceleration in growth of chest girth, height and weight, and have a slightly better physical frame.

A list drawn up of boys who had been awarded "colors" for prowess in football, cricket, swimming, running and the like showed that there were about 700 chances for exhibiting special excellence among 7,000 boys. Seventy-three of the 700 awards were won by 215 boys of special mental ability. This means that the best students took about one-tenth of the athletic honors and that one boy in three of the mental "sharks" was also a good athlete.

The degree of mental excellence seemed to be fairly proportionate to the degree of physical excellence. Out of the 73 athletic awards achieved by this group, 45 went to the 27 winning first class honors, 18 to 14 boys in the next group and only nine to the six boys in the third group.

These figures, Dr. Mumford asserted, tend to show that the growth of the human frame should be viewed as a unity and not as one of mind or body alone.

Science News-Letter, February 11, 1928

AGRICULTURE

New Chinese Cotton

A new variety of cotton, which has been given the American-sounding name of "Million-Dollar Cotton," has been bred in China, and promises to make that country at least partially independent of foreign sources of high-quality, long-stapled cotton, which must now be imported. The native varieties now universally cultivated in China all have short staple or fiber, which does not permit the weaving of high grade fabrics of normal strength.

Dr. J. B. Griffing, of the University of Nanking, reports the new variety to the *Journal of Heredity*, of Washington, D. C. He states that the new variety originated with a single plant which he discovered some years ago, as the result of a search among the very much mixed fields of Chinese cotton.

Science News-Letter, February 11, 1928

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B Philosophy.
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GB Physical geography.
GC Oceanology and oceanography.
GF Anthropogeography.
GN Anthropology. Somatology. Ethnology. Ethnography. Prehistoric archæology.
GR Folklore.
GT Manners and customs.
GV Sports and amusements. Games.
HC Economic history and conditions. National production.
HD Economic history. Agriculture and Industries.
HE Transportation and communication.
HF Commerce.
HM Sociology. General.
HQ Family. Marriage. Woman.
HV Social pathology.
L Education.
M Music.
N Fine arts.
P Philology and linguistics.
Q Science. General.
QA Mathematics.
QB Astronomy.
QC Physics.
QD Chemistry.
QE Geology.
QH Natural history.
QK Botany.
QL Zoology.
QM Human anatomy.
QP Physiology.
QR Bacteriology.
R Medicine. General.
S Agriculture. General.
SB Field crops. Horticulture. Landscape gardening. Pests and plant diseases.
SD Forestry.
SF Animal culture. Veterinary medicine.
SH Fish culture and fisheries.
SK Hunting. Game protection.
T Technology. General.
TA Engineering. General.
TC Hydraulic engineering.
TD Sanitary and municipal engineering.
TE Roads and pavements.
TF Railroads.
TG Bridges and roofs.
TH Building construction.
TJ Mechanical engineering.
TK Electrical engineering and industries.
TL Motor vehicles. Cycles. Aeronautics.
TN Mineral industries. Mining and Metallurgy.
TP Chemical technology.
TR Photography.
TS Manufactures.
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110 Metaphysics
120 Special metaphysical topics
130 Mind and body
140 Philosophical systems
150 Mental faculties. Psychology
160 Logic
170 Ethics
180 Ancient philosophers
190 Modern philosopers
200 RELIGION—
210 Natural theology
220 Bible
230 Doctrinal. Dogmatics. Theology
240 Devotional. Practical
250 Homiletic. Pastoral. Parochial
260 Church. Institutions. Work
270 Religious history
280 Christian churches and sects
290 Ethnic. Non-Christian
300 SOCIOLOGY—
310 Statistics
320 Political science
330 Political economy
340 Law
350 Administration
360 Associations. Institutions
370 Education
380 Commerce. Communication
390 Customs. Costumes. Folklore
400 PHILOLOGY—
410 Comparative
420 English
430 German
440 French
450 Italian
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470 Latin
480 Greek
490 Minor Languages
500 NATURAL SCIENCE—
510 Mathematics
520 Astronomy
530 Physics
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550 Geology
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600 USEFUL ARTS—
610 Medicine
620 Engineering
630 Agriculture
640 Domestic economy
650 Communication. Commerce
660 Chemical technology
670 Manufactures
680 Mechanic trades
690 Building
700 FINE ARTS—
710 Landscape gardening
720 Architecture
730 Sculpture
740 Drawing. Decoration. Design
750 Painting
760 Engraving
770 Photography
780 Music
790 Amusement
800 LITERATURE—
810 American
820 English
830 German
840 French
850 Italian
860 Spanish
870 Latin
880 Greek
890 Minor languages
900 HISTORY—
910 Geography and travels
920 Biography
930 Ancient history
Modern
940 Europe
950 Asia
960 Africa
970 North America
980 South America
990 Oceania and polar regions

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First Glances at New Books

ANIMAL BIOLOGY—J. B. S. Haldane and Julian Huxley — *Oxford Press* ($2.50). The youth of Britain are privileged, in having a pair of authors like Haldane and Huxley to prepare their elementary biological text for them. A book by these men may be expected to be packed with worth-while matter, to present it from fresh and provocative points of view —in short, to be wholly redeemed from "averageness." On the other hand, the quantity of material contained herein is an argument for a very high assimilative capacity on the part of the British undergraduate.

Science News-Letter, February 11, 1928

MAN AND THE EARTH—*University of Pittsburgh* (60 cents). This contains eight radio talks on "Rivers and Man," "Tides and Waves," "Men and the Ice Age," "Volcanoes," "Minerals in Industry," etc., with select bibliography.

Science News-Letter, February 11, 1928

AERIAL PHOTOGRAPHS—Dache M. Reeves—*Ronald Press* ($5). In this latest volume in the valuable Ronald Aeronautical Library, an expert on aerial photography describes the methods and their applications. Though especially written with regard to the military aspects of the subject, it will be of use to the civilian aviator as a guide to aerial photography for commercial purposes.

Science News-Letter, February 11, 1928

SPHERICAL HARMONICS—T. M. MacRobert—*Dutton* ($4.50). An elementary, though necessarily highly mathematical, account of the application of spherical harmonics to mathematical physics.

Science News-Letter, February 11, 1928

HOME STUDY BLUE BOOK—Compiled by J. S. Noffsinger—*National Home Study Council.* Briefly discusses the legitimate field of the correspondence school and gives a list of institutions approved by the National Home Study Council.

Science News-Letter, February 11, 1928

PROTECTIVE METALLIC COATINGS—Henry S. Rawdon—*Chemical Catalog* ($5.50). A useful addition to the Chemical Catalog Company's monograph series, discussing briefly but adequately the principal methods of protecting the more corrodible metals. The 31-page bibliography is an especially valuable feature.

Science News-Letter, February 11, 1928

THE STANDARDIZATION OF ERROR —Vilhjalmur Stefansson — *Norton* ($1). Dr. Stefansson meditates delightfully on some of the many things that we know aren't so, such as that Eskimos commonly dwell in ice houses and that ostriches hasten to stick their heads in the sand when frightened. Truth, he decides, is sometimes good and sometimes bad. After discussing Santa Claus, baby talk, and other educational processes he reasonably concludes that "in the training of very young children truth should be rather carefully avoided as a general thing."

Science News-Letter, February 11, 1928

ECONOMICS AND HUMAN BEHAVIOR —P. Sargant Florence—*Norton* ($1). In setting down principles of supply and demand, economists must take some account of the factor of human behavior. But because psychologists do not agree on the subject of emotions, instincts, and motives, the author urges that economists go out to gather facts for themselves on which to base a solid science of what might be called cycle-analysis.

Science News-Letter, February 11, 1928

THE ELEMENTS OF CRIME—Boris Brasol—*Oxford Press* ($5). Judge Wigmore sums up the scope of this valuable contribution to criminology in the introduction, where he says that "what the times need is an exposition which . . . . will reconcile for us the principles and experiences of psychology with the principles and experiences of criminal law." Mr. Brasol presents a wealth of fact and explanation on the much discussed question of the social and psychiatric aspects of crime.

Science News-Letter, February 11, 1928

CHRISTMAS IN STORY AND MUSIC, Radio Publication No. 33—*University of Pittsburgh* (60 cents). Contains six radio talks, in which an entertaining selection of facts and anecdotes on the celebration of Christmas is presented.

Science News-Letter, February 11, 1928

FIRST COURSE IN BOTANY — Raymond J. Pool and Arthur T. Evans—*Ginn.* A compact and well-arranged elementary text. The physiological-ecological approach is pedagogically sound, and the manner of presentation should capture the interest of most students.

Science News-Letter, February 11, 1928

THE RISE OF MODERN PHYSICS—Henry Crew—*Williams and Wilkins* ($5). From the physical ideas of the ancient Greeks, through the middle ages to Galileo, Huyghens and Newton, down to Planck, Rutherford and Bohr, is a long and fascinating story, covering, as it does, some of the greatest revolutions in human thought. But in this small volume of 360 pages, Professor Crew has told the story, leaving out none of the essentials, and in a manner that will make the book interesting reading not only to the physicist, but to anyone interested in the development of human knowledge.

Science News-Letter, February 11, 1928

MAN RISES TO PARNASSUS—Henry Fairfield Osborn—*Princeton University Press* ($2.50). In this sequel to his "Men of the Old Stone Age," Dr. Osborn fits the fragments of the broken records left by prehistoric men into a single connected mosaic depicting the cultural and spiritual evolution of the race.

Science News-Letter, February 11, 1928

A POPULAR GUIDE TO RADIO—B. Francis Dashiell—*Williams and Wilkins* ($3.50). Radio has advanced so fast in recent years that it is hard to keep abreast of it. Here is the latest work on the subject. The author, who knows what he is talking about, describes in detail all of the essentials, from the elementary basic electrical facts to the latest forms of apparatus, and the relation of radio to meteorological phenomena.

Science News-Letter, February 11, 1928

MATHEMATICS FOR AGRICULTURE AND ELEMENTARY SCIENCE — Harry Burgess Roe and others — *Ginn* ($2.80). One of the chief burdens in the lives of teachers of upperclassmen and beginning graduate students, in almost all fields of science, is their ill preparation in mathematics. This book is designed to remedy the lack, without wasting too much of the student's time on "pure" mathematics in which he is presumably not interested.

Science News-Letter, February 11, 1928

EDUCATIONAL YEARBOOK—Edited by I. L. Kandel—*Macmillan.* Detailed and valuable descriptions of the educational systems of thirty-seven different countries, issued by the International Institute of Teachers' College, Columbia University.

Science News-Letter, February 11, 1928

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